

# PATENT ABSTRACTS OF JAPAN

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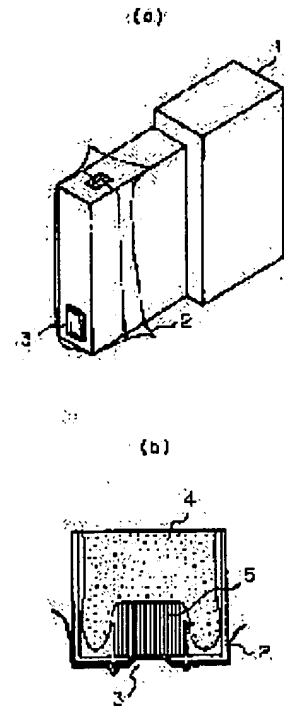
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## (54) INK TANK AND PRODUCTION THEREOF

### (57)Abstract:

**PURPOSE:** To provide an inexpensive ink tank good in productivity suppressing the evaporation and deterioration of ink and suppressing the scattering of ink at a time of opening.

**CONSTITUTION:** The part equipped with the function corresponding to an ink flowing route system and the ink supply port 3 on the side of an ink tank 1 of the connection part of the ink tank 1 are subjected to skin pack 2 by adhesion molding so as to follow the shape of the ink supply port 3.



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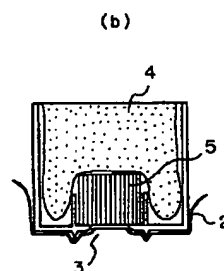
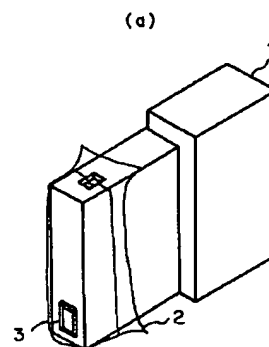
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(54) 【発明の名称】 インクタンクとその製造方法

(57) 【要約】

【目的】 インクの蒸発、インクの変質を抑え、開封時のインクの飛び散りを抑え生産性の良い低価格のインクタンク及びその製造方法を提供する。

【構成】 インク流動径路系に相当する機能を備えた部分とインクタンクの接続部分のインクタンク側のインク供給口を該インク供給口の形状にならって密着成形によりスキンパックされてなることを特徴とするインクタンク及びその製造方法。



#### 【特許請求の範囲】

【請求項1】 基板上にインク吐出口、インク流路、インク共通液室及びインク供給口からなるインク流動経路系に相当する機能を備えた部分とインクを貯蔵するインクタンクが分離されているインクジェットヘッドのインクタンクにおいて、前記インク流動経路系に相当する機能を備えた部分（以後B Gチップと呼ぶ）と前記インクタンクの接続部分のインクタンク側のインク供給口を該インク供給口の形状にならって密着成形によりスキンパックされてなることを特徴とするインクタンク。

【請求項2】 前記スキンパックは前記インクタンクのB Jチップとの接続部分の凹凸に合わせてインクタンク成型後に別工程で成型、密着される請求項1に記載のインクタンク。

【請求項3】 前記スキンパックはインクタンクの内容物が入れられる前に成型、密着される請求項1に記載のインクタンク。

【請求項4】 前記スキンパックはインクタンクの内容物が入れられた後に成型、密着される請求項1に記載のインクタンク。

【請求項5】 前記スキンパックはインクタンクの供給口の圧接体との間に空間を作らないようにした請求項1に記載のインクタンク。

【請求項6】 前記スキンパックはインクタンクの供給口が複数個のものについて同時に成型、密着される請求項1に記載のインクタンク。

【請求項7】 前記請求項1ないし6のうちいずれか1項に記載のインクタンクは、インクタンク本体、インクを吸収保持する為の吸収体、吸収体の中のインクを前記B Jチップにスムーズに供給する為の圧接体、及びインクから構成し、印字時の姿勢はインクの供給口が下向きになるようにすることを特徴とするインクタンクの製造方法。

【請求項8】 前記請求項1ないし6のうちいずれか1項に記載のインクタンクに供給されるインクはPH7以上11以下である請求項7記載のインクタンクの製造方法。

【請求項9】 前記請求項1ないし6のうちいずれか1項に記載のインクタンクに供給されるインクの表面張力が32から45 dyneの範囲である請求項7記載のインクタンクの製造方法。

#### 【発明の詳細な説明】

##### 【0001】

【産業上の利用分野】 本発明は、吐出エネルギー発生手段へ供給するためのインクを保持するインク吸収体と、圧接体が収納されたインク収納部を必要とするインクジェットカートリッジ、および該インクジェットカートリッジを備えたシリアルタイプのインクジェット記録装置用のインクタンク及びその製造方法に関する。

##### 【0002】

【従来の技術】 従来、記録液滴を形成するエネルギー発生部とそこへインクを供給するインクタンクが一体になった、或は別体の物に使用時に一体にして使用する分離タイプ、構成のインクジェットヘッド（インクジェットカートリッジ）が実用化されている。この種のインクジェットヘッドのインクタンク内には、圧縮収納された多孔質体にインクが含浸されている構成が一般的である。この多孔質体に保持されたインクはインク供給口から吐出部へ共通液室を介して吐出部のノズルの毛管力によりインクタンク内から導出される。

【0003】 インクタンクを保管する場合や、インクタンクの物流時に於て、インク供給部の保護として従来は保護テープを貼ったり、保護キャップを付けたたりあるいはその組み合わせ等インク漏れ対策をしている。

【0004】 上述した保護キャップとして、従来の例として図10に示す様に、ポリアセタール樹脂やポリプロピレン樹脂を成型して機械的に組み付ける方法や図11に示す様なポリエチレン製フィルムとアルミ箔その他の組み合わせのものを加熱することによりインクタンクに熱溶着する方法、樹脂による成型品にゴム、スポンジ等の柔軟性のある物と組み合わせて機械的に組み合わせてシールする方法などがある。

【0005】 この場合、インクタンクのインク供給口と圧接体の間に空間が発生するため保護キャップの取り付けはインクタンク製造工程の最終部分にありタンク内にインクを注入してから保護キャップを取り付けている。従来インクタンクの製造工程においてインクタンクにインクを供給して吸収体にインクを十分に吸収させる為にインクタンクを真空にしてからインクを供給して吸収体にインクを吸収させた後、吸収されなかったインクを除去して使用していた。この時インクタンクの内部を真空にする為にインクタンクの開口部を全て塞いだ上で真空ポンプにより高真空にインクの注入を行っている。

【0006】 しかしながら、従来例では、インクを含浸させる為にインクタンクを真空にして吸収体の中にインクを含浸させているが、インクを注入後にキャップをする為供給口の構造によりインク供給口の部分に空間が発生し空気溜りやインク溜りができる。この空気溜りは気温の変化や圧力の変化により体積が変化を起こしインク漏れ、飛び散りなどを起こす為空気を逃がす為の通路を設けたり気液交換の機能を設けたりしなければならぬ。インク溜りは保護キャップや保護テープを剥す時の飛び散りや、保護テープに付着したインクがテープを剥した後でテープによるインク汚れを起こす原因となっていた。またインクタンクの開口部を塞いでインクを注入した後の塞いだ治具が繰り返し使用することによりインクによって汚れそれによりインクタンクが汚れる原因となっていた。またこの汚れを取り除く為に拭き工程を設けなければならず製造コストの増大の原因となっていた。加えてカラータンクのように3色、4色一体のよう

な場合には供給口間のシールが原因となり色同志の混色の原因となっていた。

【0007】ここで、必要な機能とは、インクタンクの落下時、温度の急激な変化、振動、物流時などに吸収体内において貯蔵されたインクが不必要に外にもれ出したりしないこと、使用時には簡単に取り除くことができること、取り除く時にインク排出部分にインク溜りが無いこと、取り除く時に空気溜りによるインクの飛び散りが無いことなどが挙げられる。このような特性を得るには、イーザーオープン部材に適度な密着力のあることと、インクに浸されないこと、柔軟性があること、インク溜りが出来ないことなどが要求される。これらを達成するためにイーザーオープン部材として使用されるものは、低温度で軟化し、2種類以上の材質に接着し、成形性が良く、しかも低コストであることが要求される。

【0008】

【発明が解決しようとする課題】本発明は上記したような問題点を解決する為に、保護フィルムを圧接体、吸収体、インクなどをインクタンクに挿入する前に成型、密着させ、インク供給口の部分に空気溜りが出来ない様に保護フィルム取りはずし時にインクの飛び散り、物流時や環境の変化によるインク漏れの無いインクタンクを提供し、しかもインクタンクの中にインクを注入する前にインク供給口部分を塞ぐことでインクタンクの製造工程を簡単にし製造方法の範囲を広げ、かつ低コストで十分な機能を達成するためのインクタンクと製造方法を提供することを目的とするものである。

【0009】

【課題を解決するための手段】前記の目的は以下の手段によって達成される。即ち、本発明は、基板上にインク吐出口、インク流路、インク共通液室及びインク供給口からなるインク流動経路系に相当する機能を備えた部分とインクを貯蔵するインクタンクが分離されているインクジェットヘッドのインクタンクにおいて、前記インク流動経路系に相当する機能を備えた部分（BGチップ）と前記インクタンクの接続部分のインクタンク側のインク供給口を該インク供給口の形状にならって密着成形によりスキンパックされてなることを特徴とするインクタンクを提案するものであり、前記スキンパックは前記インクタンクのBJチップとの接続部分の凹凸に合わせてインクタンク成形後に別工程で成形、密着されること、前記スキンパックはインクタンクの内容物が入れられる前に成形、密着されること、前記スキンパックはインクタンクの内容物が入れられた後に成形、密着されること、前記スキンパックはインクタンクの供給口の圧接体との間に空間を作らないこと、前記スキンパックはインクタンクの供給口が複数個のものについて同時に成形、密着されることを含む。また、本発明は 前記スキンパックされたインクタンクは、インクタンク本体、インクを吸収保持する為の吸収体、吸収体の中のインクを前記

BJチップにスムーズに供給する為の圧接体、及びインクから構成し、印字時の姿勢はインクの供給口が下向きになるようにすることを特徴とするインクタンクの製造方法を提案するものであり、前記インクタンクに供給されるインクはPH7以上11以下の範囲であること、前記インクタンクに供給されるインクの表面張力が32から45dyneの範囲であることを含む。

【0010】以下本発明を更に詳細に説明する。

【0011】本発明は、インクタンク内のインクがタンク外部に漏れることなく、また使用時に使用者を汚すことなく、インクを有効に印字に使用出来ること、これらを成し得る為にインクタンクと保護フィルムをあらかじめ一体に密着成型し圧接体との間に空間が出来ない様にする方法であり、密着成型はインクタンクの内部が空の状態に内部に中子を挿入しインク供給口には熱可塑性のフィルムを置きインクタンクの内部を吸引することによりインクタンクとフィルムを密着させた後でフィルムに熱をかけて成型する方法である。この方法によれば成形品と成形品の組み合わせでない為成形精度による密着不良、型間精度による密着不良などを考える必要がなくなる。成型された保護フィルムと圧接体との間に出来る微小の隙間が生じるがこの隙間に発生するインク溜りは圧接体の表面張力により吸収されて前記の様な問題は起こらない。また空気溜りは温度変化などにより問題が発生するほどの体積にならず問題とならない。3色、4色同時にシールする場合に於ても全面で密着させる為色間の混色を起こすことなくシールすることが出来る。この時インク供給口の複雑さ、深さなどによりフィルムの厚みやかける温度が適宜選択される。吸引圧力、温度、形状、厚みの要素により製造条件が設定される。フィルムの材質は中に入るインクの材質、インクタンクの材質、接着剤の材質により選択される。

【0012】スキンパックはインクタンクの内容物が入れられる前に成型密着させてもインクタンクの内容物が入れられた後に成型密着させてもよい。

【0013】本発明のインクタンクを製造するにはスキンパックされたインクタンクをインクタンク本体、インクを吸収保持するための吸収体、吸収体の中のインクをBJチップにスムーズに供給し、BJチップとの接続性を向上する為の圧接体及びインクで構成し、印字中の姿勢はインクの供給口が下向きになるようにする。インクタンクに供給されるインクはPH7以上11以下とすることが好ましい。インクは通常アルカリ性のものが多いが、PH値によってはインク中にインクによる樹脂溶解物や酸化物等の異物が存在し、印字品位を落とす原因となるので、耐インク性を考慮すると上記異物が存在しない上記範囲が好ましい。また、インクの表面張力は32～45dyneの範囲とすることが好ましい。表面張力が上記範囲より小さくなるとスキンパックと圧接体との間よりインクが浸透してにじみ易くなり好ましくなく、

また表面張力が上記範囲より大きくなるとスキンパックと圧接体との間の空間に空気が溜り易くなり、スキンパック効果を発揮し得なくなり好ましくない。また、本発明ではインクの供給口が下向きになるようにしているので、使用時にインクの供給不足による不吐出になることがなく、物流時における落下、振動、温度変化により供給口5からのインクの滴下があってもスキンパックにより密着構造としているので、インク飛散等の不都合もないものである。

#### 【0014】

【実施例】以下に本発明の実施例を図面に基づいて説明する。

#### 【0015】実施例1

本発明は記録分野に限られる事なく、あらゆる液体の貯蔵容器として有効である事は言うまでもないが、ここでは、記録分野におけるインク容器（インクタンク）を例にとって説明する。

【0016】図1は、本実施例の液体貯蔵容器の模式概

略図を示している。インクの供給口を蒸発、乾燥から保護するため供給口の保護のためにスキンパックを施した様子を示したものである。図1（b）ではインクタンクの内容物5とスキンパック2が密着しており従来例の様に空間にインクが溜る様な事はなくなった。またインクタンクの外壁とも密着しており気密性が十分に保たれる構造が可能となった、図1においては、供給口はひとつしか示されていないが、インクの供給口3は並び方に関係なく複数あっても良い。

【0017】スキンパック2の材質は、CPP、塩化ビニリデン、PVC、PE、アイオノマー、HIPS、延伸PVAなどが有効であるが、材質の選定は、インクタンクの材質、インクの材質、タンクの形状に合わせて選定する。表1はPEフィルムを用いた成型した時の成形状態を示している。

#### 【0018】

【表1】

ポリエチレン スキンパック

| 寸法<br>フィルム            | フィルム厚さ   |           |           |           |           |           |     |
|-----------------------|----------|-----------|-----------|-----------|-----------|-----------|-----|
|                       | 50 $\mu$ | 100 $\mu$ | 150 $\mu$ | 200 $\mu$ | 300 $\mu$ | 500 $\mu$ | 1mm |
| A : 8 <sup>mm</sup>   | ○        | ○         | ○         | ○         | ○         | △         | ×   |
| B : 5 <sup>mm</sup>   | ○        | ○         | ○         | ○         | ○         | △         | ×   |
| C : 0.8 <sup>mm</sup> | ○        | ○         | ○         | ○         | ○         | △         | ×   |
| D : 1.5 <sup>mm</sup> | ○        | ○         | ○         | ○         | ○         | △         | ×   |

材質：PE、吸引圧力：-0.6kg/cm<sup>2</sup>  
温度：100℃

この時使用したインクタンクの材質はノリルであり、インクはPH10とし、供給口は1個の場合について行った。また供給口周囲の寸法は図2の形状の場合についての評価である。図6は、スキンパックをした時のインクの蒸発量とPEフィルムの厚さの関係を表したもので、本実施例の構成では、PEの厚さが300 $\mu$ 以上あればインクの性能を満足出来る結果を表している。しかし50～200 $\mu$ の間ではインクの蒸発量が多過ぎて性状に問題が発生してインクにじみなどが発生して維持性能を満足することができなかった。

【0019】理想的な蒸発量の範囲を図6の中に斜線で示している。

【0020】インクの蒸発量はインクタンクの樹脂の厚さにも依存している事から本実施例では樹脂の厚さを1mmとしてインクタンクを作成した。

#### 【0021】実施例2

図3は、本実施例の液体貯蔵容器の例の模式的概略図を示している。実施例1と同様にインクの供給口を蒸発、

乾燥から保護するため供給口の保護のため供給口にスキンパックを施した様子を示したものである。本例ではインクの供給口は3個あり、3個同時にスキンパックをしている。インク供給口周囲の寸法を図8に、インクタンクの供給口の並び方の代表例の寸法を図9に示す。供給口の形状にもよるが、多数個の供給口を同時にスキンパックする場合には、図4、或は図5に示す様にインクタンクに溝をつける方法や、スキンパック後に熱シールと組み合わせて使用する方法もあり、より供給口間の信頼性を高める方法を取ることが可能である。表2は塩素化ブチルゴムを用いて成型した時の成形状態を示している。本例におけるインクタンクの材質はノリルである。

【0022】図6は図3に示すようにスキンパックした時のインクの蒸発量とPEフィルムの厚さの関係を表したもので、本実施例の構成ではPEフィルムの厚さが300 $\mu$ 以上あればインクの性能を満足できる結果を表している。

#### 【0023】

【表2】

塩素化ブチル スキンパック

| 寸法<br>フィルム            | フィルム厚さ   |           |           |           |           |           |     |     |
|-----------------------|----------|-----------|-----------|-----------|-----------|-----------|-----|-----|
|                       | 50 $\mu$ | 100 $\mu$ | 150 $\mu$ | 200 $\mu$ | 300 $\mu$ | 500 $\mu$ | 1mm | 2mm |
| A : 8 <sup>mm</sup>   | ○        | ○         | ○         | ○         | ○         | △         | △   | ×   |
| B : 5 <sup>mm</sup>   | ○        | ○         | ○         | ○         | △         | △         | ×   | ×   |
| C : 0.7 <sup>mm</sup> | ○        | ○         | ○         | ○         | △         | △         | ×   | ×   |
| D : 0.3 <sup>mm</sup> | ○        | ○         | ○         | ○         | △         | △         | ×   | ×   |
| E : 4.5 <sup>mm</sup> | ○        | ○         | ○         | ○         | △         | △         | ×   | ×   |
| F : 3.5 <sup>mm</sup> | ○        | ○         | ○         | ○         | △         | △         | ×   | ×   |

材 質 : 塩素化ブチルゴム

吸引圧力 :  $-0.6\text{kg/cm}^2$ 

温 度 : 80℃

備投資を少なくしコストダウンが可能となった。

## 実施例3

図3の要領で、インクタンクの材質をPPに変えて、スキンパックの材質を塩素化ブチルに変えて実施例1と同様にインクの蒸発量を測定したところ図7の様な結果を得ることが出来た。本結果により本実施例の場合に於ては塩素化ブチルの厚さは200 $\mu$ 近辺のところに最適な所があることがわかった。

【0024】インクの蒸発量はインクタンクの樹脂厚さにも依存しているが本実施例では樹脂の厚さを1mmとしてインクタンクを作成した。

## 【0025】

【発明の効果】以上説明したように、本発明によれば、タンク交換方式のインクジェットヘッドに取りつけるインクタンクのインク供給口の保護にスキンパックをする事でより簡単にインクの蒸発量の抑制とインク供給口の保護を行うことが出来ると共に、インクタンクの中に吸収体やインク、或はその他の物を入れる前に開口部にふたをする為ゴミに対する保護が容易になる。またテープを張り付けたり、成形品のキャップを取り付けたりした時に起こるインク溜りをなくす事が出来る。

【0026】また従来インクを注入する場合にタンクの内部を真空にしてからインクを供給して吸収体の内部にインクを均一に充填していたがこの時インク供給口を機械的に塞ぐ必要がありその時にインクでインクタンクの側面を汚すなど生産性を落としたり設備投資を高くしたりする要因となっていた。本発明によれば、真空の吸引にスキンパックが耐え得る為前記の様な問題を起こす事なくインクの充填が可能となった。また熱圧縮吸収体と組み合わせて使用する場合には、インクタンクの蓋をする前にインク、吸収体その他の内部部品を挿入して吸収体にインクを機械的に吸収させてから蓋をする方法などを取ることが出来るなど、生産設備に自由度が増して設

## 【図面の簡単な説明】

【図1】図1(a)は本発明のスキンパック付インクタンクの基本的構成を示す斜視図であり、図1(b)は本発明によるインクタンク外壁、インクタンク内容物とスキンパック密着状態を示す概略図。

【図2】図1に示したインク供給口をスキンパックでパッキングした時の成形性とインク供給口の代表的な寸法を示した図。

【図3】インク供給口が3個ある場合のインクタンクの構成を示す斜視図。

【図4】図3に示したインクタンクのインク供給口の廻りに空気の抜け道を設けてスキンパック性の信頼性を上げた例を示す斜視図。

【図5】図3に示したインクタンクのインク供給口の廻りを熱シールすることでスキンパック性の信頼性を上げた例を示す斜視図。

【図6】図1に示した場合のインクタンクとフィルム厚みとインクの蒸発量の関係を示すグラフ。

【図7】図3に示した場合のインクタンクとフィルム厚みとインクの蒸発量の関係を示すグラフ。

【図8】図3に示したインク供給口をスキンパックでパッキングした時の成形性とインク供給口の代表的な寸法を示した図。

【図9】図3に示したインクタンクのインク供給口の並び方の代表例の寸法を表した図。

【図10】従来例の樹脂によるキャップを設けた例を示す図。

【図11】従来例のシールテープを施した例を示す図。

## 【符号の説明】

- 1 インクタンク
- 2 スキンパック

- 3 インク供給口
- 4 吸収体
- 5 圧接体
- 6 溝

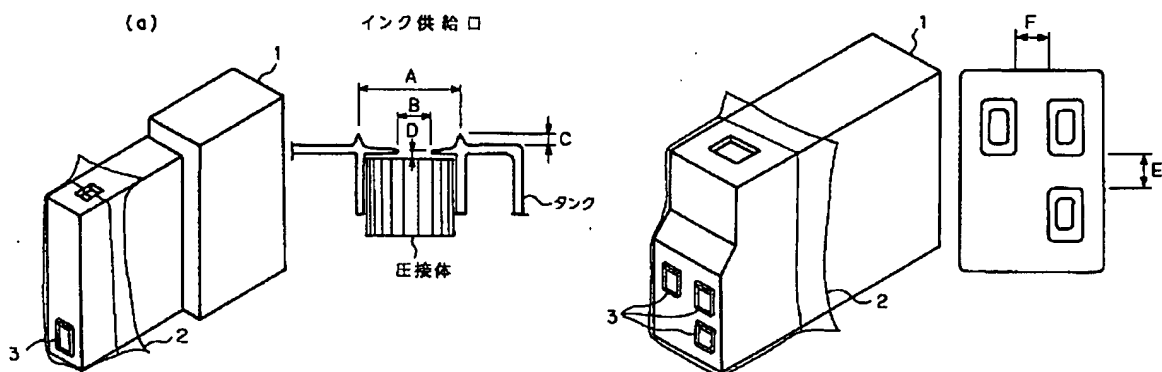
- 7 熱シール部
- 8 弾性体
- 9 樹脂キャップ
- 10 シールテープ

【図1】

【図2】

【図3】

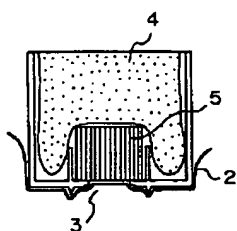
【図9】



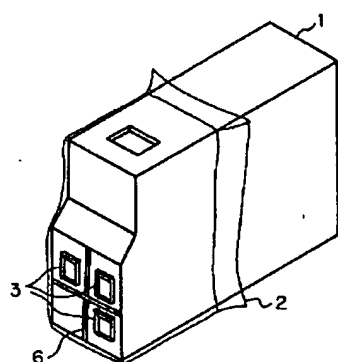
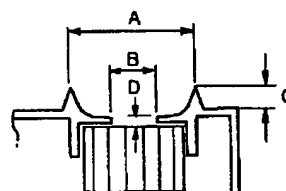
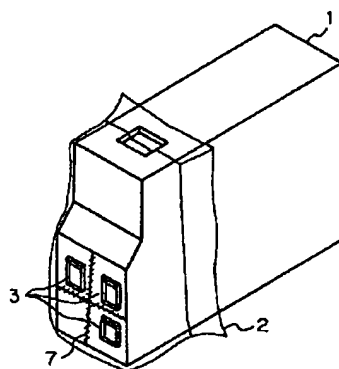
(b)

【図5】

【図8】

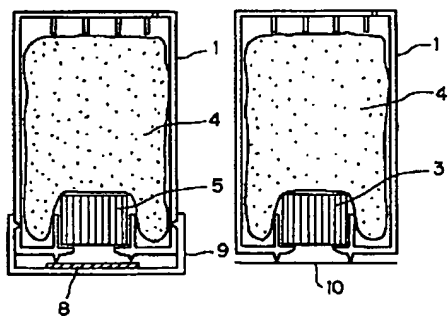


【図4】



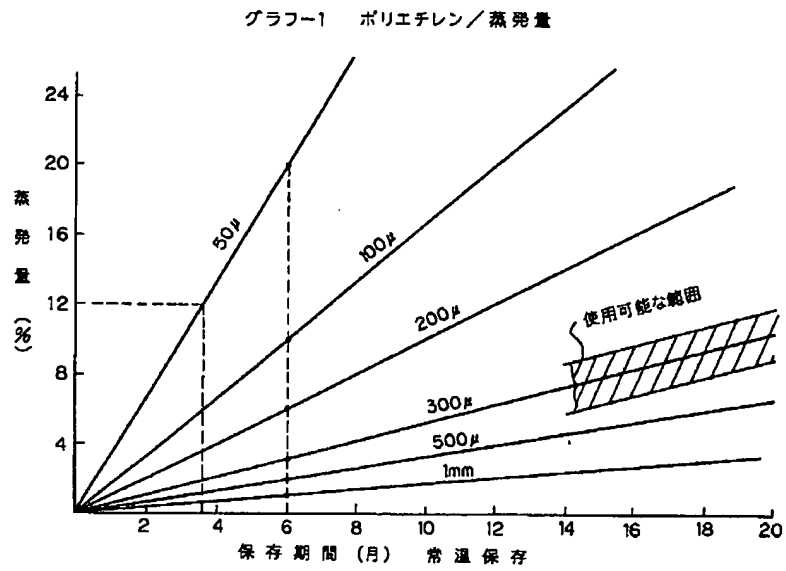
【図10】

【図11】

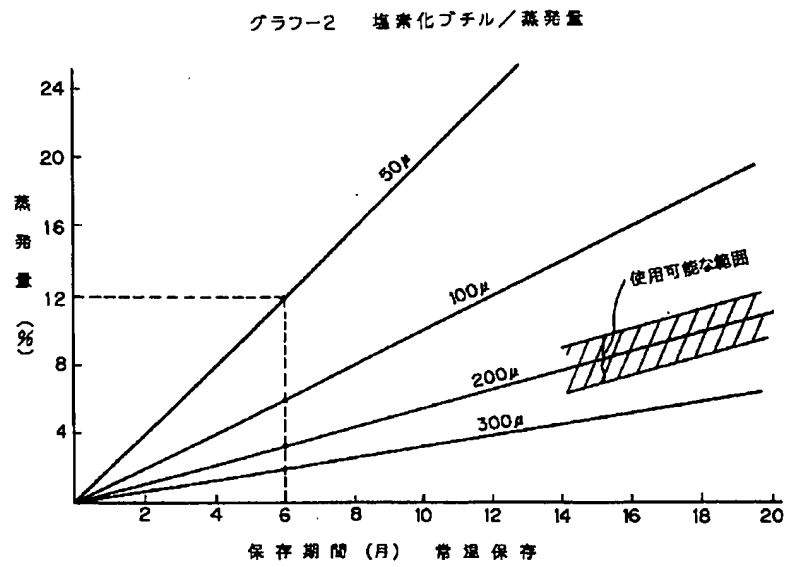




【図6】



【図7】



\* NOTICES \*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]

[Claim 1] In the ink tank of an ink jet head by which the ink tank which stores on a substrate the part equipped with the function equivalent to the ink floating path system which consists of an ink delivery, ink passage, an ink common liquid room, and an ink feed hopper, and ink is separated The ink tank characterized by learning the ink feed hopper by the side of the ink tank for the part (it being henceforth called BG chip) equipped with the function equivalent to said ink floating path system, and the connection of said ink tank from the configuration of this ink feed hopper, and coming to carry out skin packaging by adhesion shaping.

[Claim 2] Said skin packaging is an ink tank according to claim 1 to which it doubles with the irregularity for a connection with BJ chip of said ink tank, and is cast and stuck at another process after ink tank molding.

[Claim 3] Said skin packaging is an ink tank according to claim 1 to which it is cast and stuck before being put into the contents of an ink tank.

[Claim 4] Said skin packaging is an ink tank according to claim 1 to which it is cast and stuck after being put into the contents of an ink tank.

[Claim 5] Said skin packaging is the ink tank according to claim 1 it was made not to make space between the pressure-welding objects of the feed hopper of an ink tank.

[Claim 6] Said skin packaging is an ink tank according to claim 1 which the feed hopper of an ink tank is simultaneously cast about two or more things, and is stuck to it.

[Claim 7] It is the manufacture approach of the ink tank which constitutes an ink tank given in any 1 term from a pressure welding object for supply smoothly the ink in the absorber for carry out absorption maintenance of an ink tank body and the ink , and an absorber to said BJ chip , and ink said claim 1 thru/or among 6 , and is characterize by make it , as for the position at the time of printing , the feed hopper of ink become downward .

[Claim 8] The ink supplied to an ink tank given in any 1 term said claim 1 thru/or among 6 is the manufacture approach of the ink tank according to claim 7 which is 11 or less or more 7 PH.

[Claim 9] The manufacture approach of an ink tank according to claim 7 that the range of the surface tension of the ink supplied to an ink tank given in any 1 term said claim 1 thru/or among 6 is 32 to 45 dynes.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ink tank and its manufacture approach for ink jet recording devices of the serial type equipped with the ink jet cartridge which needs the ink stowage where the ink absorber holding the ink for supplying a regurgitation energy generation means and the pressure-welding object were contained, and this ink jet cartridge.

[0002]

[Description of the Prior Art] Conventionally, the ink jet head (ink jet cartridge) of a separation type and a configuration which the ink tank which supplies ink to the energy generation section which forms a record drop, and there was united, or uses for the object of another object at the time of an activity, making into one is put in practical use. In the ink tank of this kind of ink jet head, the configuration impregnation of the ink is carried out [ configuration ] to the porous body by which compression receipt was carried out is common. The ink held at this porous body is drawn from the inside of an ink tank by the capillary force of the nozzle of a discharge part through a common liquid room from an ink feed hopper to a discharge part.

[0003] Stick masking tape conventionally as protection of an ink feed zone at the case where an ink tank is kept, and the time of the PD of an ink tank, a protective cap is attached, or the measures against ink leakage, such as the combination, are taken.

[0004] The approach of carry out heat welding , the approach of combine mechanically combining an object with the flexibility of rubber , sponge , etc. , and carry out a seal at the cast by resin , etc. be in an ink tank by heat the thing of the combination of the film made from polyethylene as show in the approach of cast polyacetal resin and polypropylene resin and attach mechanically , or drawing 11 , aluminum foil , and others , as show in drawing 10 as a conventional example as a protective cap mentioned above .

[0005] In this case, since space occurs between the ink feed hopper of an ink tank, and a pressure-welding object, after the last part of an ink tank production process has installation of a protective cap and it pours in ink into a tank, it has attached the protective cap. The ink which was not absorbed was removed and used, after making the ink tank into the vacuum, supplying ink and making an absorber absorb ink, in order to supply ink to an ink tank in the production process of an ink tank conventionally and to make an absorber fully absorb ink. In order to make the interior of an ink tank into a vacuum at this time, after plugging up all openings of an ink tank, it is made a high vacuum with a vacuum pump, and ink is poured in.

[0006] However, in the conventional example, in order to carry out impregnation of the ink, an ink tank is made into a vacuum, impregnation of the ink is carried out into an absorber, but since it caps after pouring in ink, space occurs into the part of an ink feed hopper according to the structure of a feed hopper, and an air pocket and ink \*\*\*\* are made. In order that the volume may cause change for lifting ink leakage, spilling, etc. by change of atmospheric temperature, or change of a pressure, this air pocket must prepare the path for missing air, or must prepare the function of vapor-liquid exchange. Ink \*\*\*\* had become the cause of raising the ink dirt on a tape, after spilling when removing a protective cap and masking tape and the ink adhering to masking tape removed the tape. Moreover, when the fixture closed after plugging up opening of an ink tank and pouring in ink used it repeatedly, it had become the cause by which became dirty in ink and an ink tank became dirty by that cause. Moreover, it had to wipe in order to remove this dirt, and the process had to be established, and it had become the cause of buildup of a manufacturing cost. In addition, like a color tank, case [ like three colors and 4 color one ], the seal between feed hoppers became a cause and caused a color comrade's color mixture.

[0007] Here, with a required function, it is mentioned at the time of drop of an ink tank that the ink stored in the absorber at the time of the abrupt change of temperature, an oscillation, and the

PD etc. does not begin to leak outside superfluously, that it can remove easily at the time of an activity, that there is no ink \*\*\*\* in an ink blowdown part when removing, that there is no spilling of the ink by the air pocket when removing, etc. In order to acquire such a property, it is required that the moderate adhesion force is in an easy opening member, that it is not dipped in ink, that it is supple, that ink \*\*\*\* should not be made, etc. What is used as an easy opening member in order to attain these is softened at low temperature, two or more kinds of construction material is pasted, a moldability is good and to be low cost moreover is demanded.

[0008]

[Problem(s) to be Solved by the Invention] In order to solve a trouble which was described above, this invention a protection film A pressure-welding object, It is made to cast and stick before inserting an absorber, ink, etc. in an ink tank. To the appearance by which an air pocket is not made into the part of an ink feed hopper, at the time of protection film disconnection Spilling of ink, An ink tank without the ink leakage by change of the time of the PD or an environment is offered. And it aims at offering the ink tank and the manufacture approach for simplifying the production process of an ink tank by plugging up an ink feed hopper part, extending the range of the manufacture approach and attaining sufficient function by low cost, before pouring in ink into an ink tank.

[0009]

[Means for Solving the Problem] The aforementioned object is attained by the following means. Namely, this invention is set on the ink tank of an ink jet head by which the ink tank which stores on a substrate the part equipped with the function equivalent to the ink floating path system which consists of an ink delivery, ink passage, an ink common liquid room, and an ink feed hopper, and ink is separated. It is what proposes the ink tank characterized by learning the ink feed hopper by the side of the ink tank for the part (BG chip) equipped with the function equivalent to said ink floating path system, and the connection of said ink tank from the configuration of this ink feed hopper, and coming to carry out skin packaging by adhesion shaping. Said skin packaging is doubled with the irregularity for a connection with BJ chip of said ink tank, and it is fabricated and stuck at another process after ink tank shaping, Before said skin packaging is put into the contents of an ink tank, it is fabricated and stuck, After said skin packaging is put into the contents of an ink tank, it is fabricated and stuck, It includes said skin packaging's not making space between the pressure-welding objects of the feed hopper of an ink tank and said skin packaging being simultaneously fabricated about the thing of plurality [ feed hopper / of an ink tank ], and being stuck. Moreover, this invention Said ink tank by which skin packaging was carried out The pressure-welding object for supplying smoothly the ink in the absorber for carrying out absorption maintenance of an ink tank body and the ink, and an absorber to said BJ chip, And it constitutes from ink and the position at the time of printing is what proposes the manufacture approach of the ink tank characterized by making it the feed hopper of ink become downward. The surface tension of the ink supplied to that the ink supplied to said ink tank is the range of or more 7 or less 11 PH and said ink tank includes that it is the range of 32 to 45 dynes.

[0010] This invention is further explained to a detail below.

[0011] This invention can use ink for printing effectively, without [ without the ink in an ink tank leaks to the tank exterior, and ] disgracing a user at the time of an activity, It is the approach that adhesion molding is carried out and an ink tank and a protection film are made to be made by space between pressure-welding objects in one beforehand since these can be accomplished. Adhesion molding is the approach of applying to which and casting heat on a film, after sticking

an ink tank and a film by the interior of an ink tank inserting a core in the interior by sky condition, putting a thermoplastic film on an ink feed hopper, and attracting the interior of an ink tank. Since it is not the combination of mold goods and mold goods according to this approach, the need of considering the poor adhesion by shaping precision and the poor adhesion by the precision between molds is lost. Although the minute clearance made between the protection films and pressure-welding objects which were cast is generated, ink \*\*\*\* generated in this clearance is absorbed by the surface tension of a pressure-welding object, and the above problems do not arise. Moreover, an air pocket does not become the volume to the extent that a problem occurs by a temperature change etc., and does not pose a problem. A seal can be carried out without starting the color mixture between colors, in order to make it stick on the whole surface, when carrying out a seal to three colors and 4 color coincidence. At this time, the thickness and the temperature to apply of a film are suitably chosen by the complexity of an ink feed hopper, the depth, etc. Manufacture conditions are set up with the element of suction pressure, temperature, a configuration, and thickness. The construction material of a film is chosen by the construction material of the ink included in inside, the construction material of an ink tank, and the construction material of adhesives.

[0012] Even if skin packaging carried out molding adhesion before being put into the contents of an ink tank, after it is put into the contents of an ink tank, it may carry out molding adhesion.

[0013] The ink in the absorber for carrying out absorption maintenance of an ink tank body and the ink for the ink tank by which skin packaging was carried out for manufacturing the ink tank of this invention, and an absorber is smoothly supplied to BJ chip, connectability with BJ chip is constituted from the pressure-welding object and ink for improving, and it is made, as for the position under printing, for the feed hopper of ink to become downward. As for the ink supplied to an ink tank, it is desirable to be referred to as 11 or less or more 7 PH. Although ink usually has many alkaline things, since it becomes the cause by which foreign matters in ink, such as a resin melt and an oxide, exist depending on PH value, and printing grace is dropped into ink, when ink-proof nature is taken into consideration, the above-mentioned range where the above-mentioned foreign matter does not exist is desirable. Moreover, as for the surface tension of ink, it is desirable to consider as the range of 32-45 dynes. If surface tension becomes smaller than the above-mentioned range, ink will permeate from between skin packaging and pressure-welding objects, and will become easy to bleed, and it becomes [ if surface tension becomes larger than the above-mentioned range preferably the space between skin packaging and a pressure-welding object will become easy to be covered with air, and ] impossible to demonstrate the skin packaging effectiveness, and is not desirable. Moreover, since it is considering as adhesion structure by skin packaging even if it does not become the non-regurgitation depended insufficient [ supply of ink ] at the time of an activity and there is dropping of the ink from a feed hopper 5 by the drop at the time of the PD, an oscillation, and the temperature change, since he is trying for the feed hopper of ink to become downward in this invention, there is also no inconvenience, such as ink scattering.

[0014]

[Example] The example of this invention is explained based on a drawing below.

[0015] Without restricting example 1 this invention to the record field, although it cannot be overemphasized that it is effective as a storage container of all liquids, here explains taking the case of the ink container (ink tank) in the record field.

[0016] Drawing 1 shows the \*\* type schematic diagram of the liquid storage container of this example. In order to protect the feed hopper of ink from evaporation and desiccation, signs that

skin packaging was given for protection of a feed hopper are shown. In drawing 1 (b), it was lost that the contents 5 and skin packaging 2 of an ink tank have stuck, and space is covered with ink like the conventional example. Moreover, in drawing 1 whose structure where had stuck the outer wall of an ink tank and airtightness was fully maintained became possible, although, as for the feed hopper, only one is shown, the feed hopper 3 of ink may have more than one regardless of how to be located in a line.

[0017] Although the construction material of skin packaging 2 has CPP, a vinylidene chloride, PVC and PE, an ionomer, HIPS, effective Drawing PVA, etc., selection of construction material is selected according to the construction material of an ink tank, the construction material of ink, and the configuration of a tank. A table 1 shows the shaping condition when casting of having used PE film.

[0018]

[A table 1]

The construction material of the ink tank used at this time was noryl, ink was set to PH10 and the feed hopper followed one case. Moreover, the dimension of the perimeter of a feed hopper is assessment about the case of the configuration of drawing 2 . Drawing 6 is a thing showing the relation between the evaporation of the ink when carrying out skin packaging, and the thickness of PE film, and expresses the result which can be satisfied with the configuration of this example of the engine performance of ink if there is 300micro or more of thickness of PE. However, between 50-200micro, there was too much evaporation of ink, and a problem was not able to occur in description, an ink blot etc. was not able to occur in it, and it could not be satisfied with it of the maintenance engine performance.

[0019] The slash shows the range of ideal evaporation in drawing 6 .

[0020] Since it was dependent also on the thickness of the resin of an ink tank, in this example, the evaporation of ink set thickness of resin to 1mm, and created the ink tank.

[0021] Example 2 drawing 3 shows the typical schematic diagram of the example of the liquid storage container of this example. In order to protect the feed hopper of ink from evaporation and desiccation like an example 1, signs that skin packaging was given to the feed hopper for protection of a feed hopper are shown. In this example, the feed hopper of ink is making skin packaging those with three piece, and three-piece coincidence. The dimension of the perimeter of an ink feed hopper is shown in drawing 8 , and the dimension of the example of representation of the list direction of the feed hopper of an ink tank is shown in drawing 9 . Although based also

on the configuration of a feed hopper, when carrying out skin packaging of many feed hoppers simultaneously, it is possible to take the approach of the approach of attaching a slot to an ink tank, and the approach of using it combining a heat seal after skin packaging also having, as shown in drawing 4 or drawing 5 , and raising the dependability between feed hoppers more. A table 2 shows the shaping condition when casting using chlorinated butyl rubber. The construction material of the ink tank in this example is noryl.

[0022] Drawing 6 is a thing showing the relation between the evaporation of the ink when carrying out skin packaging, and the thickness of Pe film, as shown in drawing 3 , and it expresses the result which can be satisfied with the configuration of this example of the engine performance of ink if there is 300micro or more of thickness of Pe film.

[0023]

[A table 2]

When the construction material of an ink tank was changed into PP, the construction material of skin packaging was changed into chlorination butyl and the evaporation of ink was measured like the example 1 in the way of example 3 drawing 3 , a result like drawing 7 was able to be obtained. It turned out that there is the place for the place of nearly 200micro where the thickness of chlorination butyl is the optimal in the case of this example by this result.

[0024] Although it was dependent also on the resin thickness of an ink tank, in this example, the evaporation of ink set thickness of resin to 1mm, and created the ink tank.

[0025]

[Effect of the Invention] As explained above, while being able to perform control of the evaporation of ink, and protection of an ink feed hopper more easily by making skin packaging protection of the ink feed hopper of the ink tank attached in the ink jet head of tank exchange system according to this invention, in order to cover opening before putting in an absorber, ink, or other objects into an ink tank, the protection to dust becomes easy. Moreover, ink \*\*\*\* which happens when a tape is stuck or the cap of mold goods is attached can be lost.

[0026] Moreover, although ink was supplied and homogeneity was filled up with ink inside the absorber after making the interior of a tank into the vacuum, when ink was poured in

conventionally, the ink feed hopper needed to be mechanically plugged up at this time, and it had become the factor which drops productivity, such as soiling the side face of an ink tank in ink then, or makes plant-and-equipment investment high. According to this invention, restoration of ink was attained, without causing the above problems, since skin packaging can be equal to vacuum attraction. Moreover, when using it in a heat compression absorber and combination, after inserting ink and the internal components of an absorber and others and making an absorber absorb ink mechanically before covering with the lid of an ink tank, the degree of freedom of take [ the approach of covering etc. ] increased to the production facility, it lessened plant-and-equipment investment, and the cost cut of the ability to take was attained. [ it ]

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## TECHNICAL FIELD

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[Industrial Application] This invention relates to the ink tank and its manufacture approach for ink jet recording devices of the serial type equipped with the ink jet cartridge which needs the ink stowage where the ink absorber holding the ink for supplying a regurgitation energy generation means and the pressure-welding object were contained, and this ink jet cartridge.  
[0002]

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## PRIOR ART

---

[Description of the Prior Art] Conventionally, the ink jet head (ink jet cartridge) of a separation type and a configuration which the ink tank which supplies ink to the energy generation section which forms a record drop, and there was united, or uses for the object of another object at the time of an activity, making into one is put in practical use. In the ink tank of this kind of ink jet head, the configuration impregnation of the ink is carried out [ configuration ] to the porous body by which compression receipt was carried out is common. The ink held at this porous body is drawn from the inside of an ink tank by the capillary force of the nozzle of a discharge part through a common liquid room from an ink feed hopper to a discharge part.

[0003] Stick masking tape conventionally as protection of an ink feed zone at the case where an ink tank is kept, and the time of the PD of an ink tank, a protective cap is attached, or the measures against ink leakage, such as the combination, are taken.

[0004] The approach of carry out heat welding , the approach of combine mechanically combining an object with the flexibility of rubber , sponge , etc. , and carry out a seal at the cast by resin , etc. be in an ink tank by heat the thing of the combination of the film made from polyethylene as show in the approach of cast polyacetal resin and polypropylene resin and attach mechanically , or drawing 11 , aluminum foil , and others , as show in drawing 10 as a conventional example as a protective cap mentioned above .

[0005] In this case, since space occurs between the ink feed hopper of an ink tank, and a pressure-welding object, after the last part of an ink tank production process has installation of a protective cap and it pours in ink into a tank, it has attached the protective cap. The ink which was not absorbed was removed and used, after making the ink tank into the vacuum, supplying ink and making an absorber absorb ink, in order to supply ink to an ink tank in the production process of an ink tank conventionally and to make an absorber fully absorb ink. In order to make the interior of an ink tank into a vacuum at this time, after plugging up all openings of an ink tank, it is made a high vacuum with a vacuum pump, and ink is poured in.



[0006] However, in the conventional example, in order to carry out impregnation of the ink, an ink tank is made into a vacuum, impregnation of the ink is carried out into an absorber, but since it caps after pouring in ink, space occurs into the part of an ink feed hopper according to the structure of a feed hopper, and an air pocket and ink \*\*\*\* are made. In order that the volume may cause change for lifting ink leakage, spilling, etc. by change of atmospheric temperature, or change of a pressure, this air pocket must prepare the path for missing air, or must prepare the function of vapor-liquid exchange. Ink \*\*\*\* had become the cause of raising the ink dirt on a tape, after spilling when removing a protective cap and masking tape and the ink adhering to masking tape removed the tape. Moreover, when the fixture closed after plugging up opening of an ink tank and pouring in ink used it repeatedly, it had become the cause by which became dirty in ink and an ink tank became dirty by that cause. Moreover, it had to wipe in order to remove this dirt, and the process had to be established, and it had become the cause of buildup of a manufacturing cost. In addition, like a color tank, case [ like three colors and 4 color one ], the seal between feed hoppers became a cause and caused a color comrade's color mixture.

[0007] Here, with a required function, it is mentioned at the time of drop of an ink tank that the ink stored in the absorber at the time of the abrupt change of temperature, an oscillation, and the PD etc. does not begin to leak outside superfluously, that it can remove easily at the time of an activity, that there is no ink \*\*\*\* in an ink blowdown part when removing, that there is no spilling of the ink by the air pocket when removing, etc. In order to acquire such a property, it is required that the moderate adhesion force is in an easy opening member, that it is not dipped in ink, that it is supple, that ink \*\*\*\* should not be made, etc. What is used as an easy opening member in order to attain these is softened at low temperature, two or more kinds of construction material is pasted, a moldability is good and to be low cost moreover is demanded.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, while being able to perform control of the evaporation of ink, and protection of an ink feed hopper more easily by making skin packaging protection of the ink feed hopper of the ink tank attached in the ink jet head of tank exchange system according to this invention, in order to cover opening before putting in an absorber, ink, or other objects into an ink tank, the protection to dust becomes easy. Moreover, ink \*\*\*\* which happens when a tape is stuck or the cap of mold goods is attached can be lost.

[0026] Moreover, although ink was supplied and homogeneity was filled up with ink inside the absorber after making the interior of a tank into the vacuum, when ink was poured in conventionally, the ink feed hopper needed to be mechanically plugged up at this time, and it had become the factor which drops productivity, such as soiling the side face of an ink tank in ink then, or makes plant-and-equipment investment high. According to this invention, restoration of ink was attained, without causing the above problems, since skin packaging can be equal to vacuum attraction. Moreover, when using it in a heat compression absorber and combination, after inserting ink and the internal components of an absorber and others and making an absorber absorb ink mechanically before covering with the lid of an ink tank, the degree of freedom of take [ the approach of covering etc. ] increased to the production facility, it lessened plant-and-equipment investment, and the cost cut of the ability to take was attained. [ it ]

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] In order to solve a trouble which was described above, this invention a protection film A pressure-welding object, It is made to cast and stick before inserting an absorber, ink, etc. in an ink tank. To the appearance by which an air pocket is not made into the part of an ink feed hopper, at the time of protection film disconnection Spilling of ink, An ink tank without the ink leakage by change of the time of the PD or an environment is offered. And it aims at offering the ink tank and the manufacture approach for simplifying the production process of an ink tank by plugging up an ink feed hopper part, extending the range of the manufacture approach and attaining sufficient function by low cost, before pouring in ink into an ink tank.

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## MEANS

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[Means for Solving the Problem] The aforementioned object is attained by the following means. That is, it is characterized by equipping this invention with the following. In the ink tank of an ink jet head by which the ink tank which stores on a substrate the part equipped with the function equivalent to the ink floating path system which consists of an ink delivery, ink passage, an ink common liquid room, and an ink feed hopper, and ink is separated It is what proposes the ink tank characterized by learning the ink feed hopper by the side of the ink tank for the part (BG chip) equipped with the function equivalent to said ink floating path system, and the connection of said ink tank from the configuration of this ink feed hopper, and coming to carry out skin packaging by adhesion shaping. Said skin packaging is \*\* to which it doubles with the irregularity for a connection with BJ chip of said ink tank, and is fabricated and stuck at another process after ink tank shaping. Said skin packaging is \*\* to which it is fabricated and stuck before being put into the contents of an ink tank. Said skin packaging is \*\* to which it is fabricated and stuck after being put into the contents of an ink tank. For said skin packaging, not making space between the pressure-welding objects of the feed hopper of an ink tank and said skin packaging are \*\* which the feed hopper of an ink tank is fabricated and is simultaneously stuck to it about two or more things. Moreover, this invention It is characterized by equipping with the following said ink tank by which skin packaging was carried out. the ink it constitute from a pressure welding object for supply smoothly the ink in the absorber for carry out the absorption maintenance of an ink tank body and the ink and an absorber to said BJ chip and ink , and the position at the time of printing propose the manufacture approach of the ink tank characterize by make it the feed hopper of ink become downward by ink , and be supply to said ink tank by ink be which be the range of or more 7 or less 11 PH . \*\* the range of whose surface tension of the ink supplied to said ink tank is 32 to 45 dynes

[0010] This invention is further explained to a detail below.

[0011] This invention can use ink for printing effectively, without [ without the ink in an ink tank leaks to the tank exterior, and ] disgracing a user at the time of an activity, It is the approach that adhesion molding is carried out and an ink tank and a protection film are made to be made by space between pressure-welding objects in one beforehand since these can be accomplished. Adhesion molding is the approach of applying to which and casting heat on a film, after sticking an ink tank and a film by the interior of an ink tank inserting a core in the interior by sky condition, putting a thermoplastic film on an ink feed hopper, and attracting the interior of an ink tank. Since it is not the combination of mold goods and mold goods according to this approach, the need of considering the poor adhesion by shaping precision and the poor adhesion by the precision between molds is lost. Although the minute clearance made between the protection

films and pressure-welding objects which were cast is generated, ink \*\*\*\* generated in this clearance is absorbed by the surface tension of a pressure-welding object, and the above problems do not arise. Moreover, an air pocket does not become the volume to the extent that a problem occurs by a temperature change etc., and does not pose a problem. A seal can be carried out without starting the color mixture between colors, in order to make it stick on the whole surface, when carrying out a seal to three colors and 4 color coincidence. At this time, the thickness and the temperature to apply of a film are suitably chosen by the complexity of an ink feed hopper, the depth, etc. Manufacture conditions are set up with the element of suction pressure, temperature, a configuration, and thickness. The construction material of a film is chosen by the construction material of the ink included in inside, the construction material of an ink tank, and the construction material of adhesives.

[0012] Even if skin packaging carried out molding adhesion before being put into the contents of an ink tank, after it is put into the contents of an ink tank, it may carry out molding adhesion.

[0013] The ink in the absorber for carrying out absorption maintenance of an ink tank body and the ink for the ink tank by which skin packaging was carried out for manufacturing the ink tank of this invention, and an absorber is smoothly supplied to BJ chip, connectability with BJ chip is constituted from the pressure-welding object and ink for improving, and it is made, as for the position under printing, for the feed hopper of ink to become downward. As for the ink supplied to an ink tank, it is desirable to be referred to as 11 or less or more 7 PH. Although ink usually has many alkaline things, since it becomes the cause by which foreign matters in ink, such as a resin melt and an oxide, exist depending on PH value, and printing grace is dropped into ink, when ink-proof nature is taken into consideration, the above-mentioned range where the above-mentioned foreign matter does not exist is desirable. Moreover, as for the surface tension of ink, it is desirable to consider as the range of 32-45 dynes. If surface tension becomes smaller than the above-mentioned range, ink will permeate from between skin packaging and pressure-welding objects, and will become easy to bleed, and it becomes [ if surface tension becomes larger than the above-mentioned range preferably the space between skin packaging and a pressure-welding object will become easy to be covered with air, and ] impossible to demonstrate the skin packaging effectiveness, and is not desirable. Moreover, since it is considering as adhesion structure by skin packaging even if it does not become the non-regurgitation depended insufficient [ supply of ink ] at the time of an activity and there is dropping of the ink from a feed hopper 5 by the drop at the time of the PD, an oscillation, and the temperature change, since he is trying for the feed hopper of ink to become downward in this invention, there is also no inconvenience, such as ink scattering.

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## EXAMPLE

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[Example] The example of this invention is explained based on a drawing below.

[0015] Without restricting example 1 this invention to the record field, although it cannot be overemphasized that it is effective as a storage container of all liquids, here explains taking the case of the ink container (ink tank) in the record field.

[0016] Drawing 1 shows the \*\* type schematic diagram of the liquid storage container of this example. In order to protect the feed hopper of ink from evaporation and desiccation, signs that skin packaging was given for protection of a feed hopper are shown. In drawing 1 (b), it was lost that the contents 5 and skin packaging 2 of an ink tank have stuck, and space is covered with ink like the conventional example. Moreover, in drawing 1 whose structure where had stuck the

outer wall of an ink tank and airtightness was fully maintained became possible, although, as for the feed hopper, only one is shown, the feed hopper 3 of ink may have more than one regardless of how to be located in a line.

[0017] Although the construction material of skin packaging 2 has CPP, a vinylidene chloride, PVC and PE, an ionomer, HIPS, effective Drawing PVA, etc., selection of construction material is selected according to the construction material of an ink tank, the construction material of ink, and the configuration of a tank. A table 1 shows the shaping condition when casting of having used PE film.

[0018]

[A table 1]

The construction material of the ink tank used at this time was noryl, ink was set to PH10 and the feed hopper followed one case. Moreover, the dimension of the perimeter of a feed hopper is assessment about the case of the configuration of drawing 2 . Drawing 6 is a thing showing the relation between the evaporation of the ink when carrying out skin packaging, and the thickness of PE film, and expresses the result which can be satisfied with the configuration of this example of the engine performance of ink if there is 300micro or more of thickness of PE. However, between 50-200micro, there was too much evaporation of ink, and a problem was not able to occur in description, an ink blot etc. was not able to occur in it, and it could not be satisfied with it of the maintenance engine performance.

[0019] The slash shows the range of ideal evaporation in drawing 6 .

[0020] Since it was dependent also on the thickness of the resin of an ink tank, in this example, the evaporation of ink set thickness of resin to 1mm, and created the ink tank.

[0021] Example 2 drawing 3 shows the typical schematic diagram of the example of the liquid storage container of this example. In order to protect the feed hopper of ink from evaporation and desiccation like an example 1, signs that skin packaging was given to the feed hopper for protection of a feed hopper are shown. In this example, the feed hopper of ink is making skin packaging those with three piece, and three-piece coincidence. The dimension of the perimeter of an ink feed hopper is shown in drawing 8 , and the dimension of the example of representation of the list direction of the feed hopper of an ink tank is shown in drawing 9 . Although based also on the configuration of a feed hopper, when carrying out skin packaging of many feed hoppers simultaneously, it is possible to take the approach of the approach of attaching a slot to an ink tank, and the approach of using it combining a heat seal after skin packaging also having, as

shown in drawing 4 or drawing 5 , and raising the dependability between feed hoppers more. A table 2 shows the shaping condition when casting using chlorinated butyl rubber. The construction material of the ink tank in this example is noryl.

[0022] Drawing 6 is a thing showing the relation between the evaporation of the ink when carrying out skin packaging, and the thickness of Pe film, as shown in drawing 3 , and it expresses the result which can be satisfied with the configuration of this example of the engine performance of ink if there is 300micro or more of thickness of Pe film.

[0023]

[A table 2]

When the construction material of an ink tank was changed into PP, the construction material of skin packaging was changed into chlorination butyl and the evaporation of ink was measured like the example 1 in the way of example 3 drawing 3 , a result like drawing 7 was able to be obtained. It turned out that there is the place for the place of nearly 200micro where the thickness of chlorination butyl is the optimal in the case of this example by this result.

[0024] Although it was dependent also on the resin thickness of an ink tank, in this example, the evaporation of ink set thickness of resin to 1mm, and created the ink tank.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] Drawing 1 (a) is the schematic diagram showing an ink tank outer wall, and ink tank contents and a skin packaging adhesion condition are the perspective view showing the fundamental configuration of the ink tank with skin packaging of this invention, and according [ drawing 1 (b) ] to this invention.

[Drawing 2] Drawing having shown the moldability when carrying out packing of the ink feed hopper shown in drawing 1 by skin packaging, and the typical dimension of an ink feed hopper.

[Drawing 3] The perspective view showing the configuration of an ink tank in case there are three ink feed hoppers.

[Drawing 4] The perspective view showing the example which established the byroad of air and raised the dependability of skin packaging nature to the surroundings of the ink feed hopper of the ink tank shown in drawing 3 .

[Drawing 5] The perspective view showing the example which raised the dependability of skin packaging nature by carrying out the heat seal of the surroundings of the ink feed hopper of the ink tank shown in drawing 3 .

[Drawing 6] The graph which shows the relation between the ink tank at the time of being shown in drawing 1 , film thickness, and the evaporation of ink.

[Drawing 7] The graph which shows the relation between the ink tank at the time of being shown in drawing 3 , film thickness, and the evaporation of ink.

[Drawing 8] Drawing having shown the moldability when carrying out packing of the ink feed hopper shown in drawing 3 by skin packaging, and the typical dimension of an ink feed hopper.

[Drawing 9] Drawing showing the dimension of the example of representation of the list direction of the ink feed hopper of the ink tank shown in drawing 3 ..

[Drawing 10] Drawing showing the example which prepared the cap by the resin of the conventional example.

[Drawing 11] Drawing showing the example which gave the sealing tape of the conventional example.

[Description of Notations]

- 1 Ink Tank
  - 2 Skin Packaging
  - 3 Ink Feed Hopper
  - 4 Absorber
  - 5 Pressure-Welding Object
  - 6 Slot
  - 7 Heat Seal Section
  - 8 Elastic Body
  - 9 Resin Cap
  - 10 Sealing Tape
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[Translation done.]